XXXI. *A Letter from the Prince* de Croy *to the Earl of* Morton, *Preſident of the R. S. containing the Obſervations of the Eclipſes of the Sun of the* 16*th of* Auguſt 1765, *and of the* 5*th of* Auguſt 1766, *made at* Calais, *together with ſome Remarks on the firſt of theſe Eclipſes: Tranſlated from the* French, *by* Mathew Maty, *M. D. Sec. R. S.*

Calais, Auguſt 9, 1766.

My Lord,

Read Nov. 27, 1766. I Have the honour to ſend your lordſhip, according to your deſire, the curious obſervation, which I made of the eclipſe of laſt year; and likewiſe incloſe with it the obſervation we juſt now have been making, and which, though leſs curious, (becauſe this part of the moon has neither pits nor mountains), confirms the former with regard to the height of the cuſps, or that ſmall elevation which is ſeen againſt the ſun's cuſps. I do not ſend the figure of the latter, becauſe it is nearly the ſame thing, excepting that it was, as you know, towards the lower part of the ſun. I think I have ſeen enough to conclude, that the atmoſphere of the moon extends to at leaſt double the height of the higheſt mountains

in it, and that it has ſome dry cavities, which ſink below the diſk. Theſe two remarks, having been thought curious by Mr. Le Monier, and Mr. Caſſiny, I have taken the liberty to communicate them to you; and have the honour to be,

My Lord,

Your Lordſhip's

moſt obedient humble Servant,

Le Prince de Croy.

Obſervation of the Eclipſe of the Sun, of the 16th of Auguſt 1765, *at* Calais, *near the Steeple, in the ſame Place, where the central and annular Eclipſe was obſerved.*

Beginning - - -	3^h	50′	46″*
End - - - -	5	8	$17\frac{1}{2}$
The duration, of which I am very certain	1	17	$31\frac{1}{2}$

The greateſt magnitude was of $2^{dig.}$ $50^{min.}$

The points of ingreſs and egreſs are marked as they appeared to us in the three refracting teleſcopes, two of which had very nice micrometers, and in the large

* This might have happened 1″ ſooner, viz. at 45″, on account of the uncertainty of the ingreſs. I, however, think the former determination juſt, becauſe I, at that inſtant, was pointing with the great refractor towards the ſpot, where the moon entered, and I was ſtruck with the ſuddenneſs of the ingreſs of the penumbra.

refractor.

refractor. Theſe, as well as the ſize of the cuſps and the number of digits, were verified by Mr. de Fourcroy, chief engineer, who was ſo good as to aſſiſt us, and by Mr. Mouron, who aſſiſted Mr. Blondeau in the obſervation of the annular eclipſe.

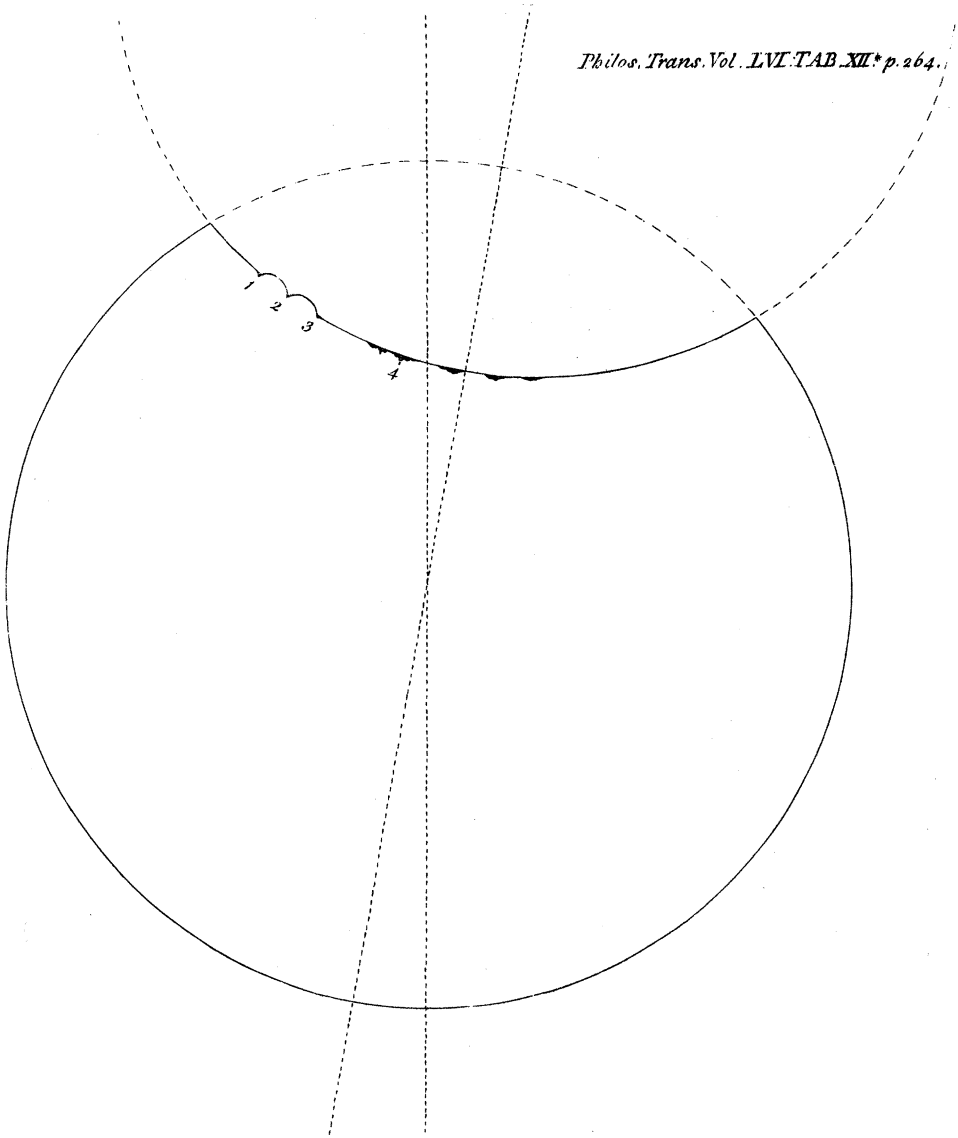
There apppeared hardly any ſign of an atmoſphere, except againſt the cuſps of the ſun, which ſeemed ſomething bigger at the two ſides, which touched the moon. There is no indication of one any where elſe, unleſs that the diſk ſeems not ſo well defined at the ingreſs and egreſs. Theſe two remarks would induce me to believe there is a ſmall atmoſphere; and this is the ſubject of a ſeparate memoir.

I ſaw very diſtinctly with the reflector of 4 feet 3 inches (which anſwers a common teleſcope of 70 or 80 feet) and with the acromatic teleſcope, ſeveral mountains, and particularly five, which I have delineated (ſee TAB. XII), beſides ſome inequalities. I always ſaw them in their fixed places, whatever motion was given to the teleſcope.

N° 1. Emerged from the ſun's left limb or cuſp at	- - -	$4^h\ 32'\ 6''$
2.	- - - -	4 35 18
3.	- - - -	4 38 6

Theſe ſeemed to have their ſummits at about an equal diſtance from one another.

The mountain N°. 4. which was the higheſt and well defined, made its exit at $4^h\ 45'\ 0''$; it was accompanied with a ſmaller but well defined one a little on the left. On the right hand ſeveral inequalities remained; but the right limb of the moon had none, and was ſmooth and perfectly well defined.


1
2
3
4

We all four very well ſaw theſe mountains, and we certify their exiſtence. The three firſt ſeemed to have hollows between them, which penetrate a little into the moon; all the reſt projected out of the diſc.

The clock was verified by the meridian the ſix following days. The whole is referred to the meridian and point of Calais; and it appears that the time marked for the new moon of that day requires a rectification. Signed,

Prince de Croy, De Fourcroy, chief Engnieer,
Garnier, Engineer: Mouron.

Remarks on the Eclipſe of the 16*th of* Auguſt 1765 *at* Calais, *with regard to the Atmoſphere, and the Mountains ſeen in profile.*

The Atmoſphere.

Upon mature conſideration, I think the moon's atmoſphere perceptible, ſee Fig. 1. 1. Becauſe the two ſmall elevations, which I conſtantly ſaw of the ſun's limb, towards the cuſps, is eaſily diſtinguiſhed in the large teleſcope, through which the other parts appeared very exactly defined. It is true that the ſun appears equally bright at the place of this ſmall elevation, but the atmoſphere cannot affect its brightneſs, and can only ſomewhat raiſe the rays, which pervade or ſlide over a denſer medium.

2. Becauſe this elevation is gradual, riſing higher towards the moon, according to the degree of the denſity of its atmoſphere.

3. Becauſe this elevation of the ſun againſt the cuſps ſeemed to me a little higher than the mountain N°. 4. which jetted out the moſt on a ſide view.

4. Becauſe the penumbra, which I obſerved at the ingreſs and egreſs, and which certainly is much leſs defined than towards the middle, is very probably occaſioned by the mixture of the rays, which are refracted in paſſing through the lunar atmoſphere. This appears to me more likely than that it ſhould be cauſed by the inflexion of the light, from the globe of the moon; becauſe ſuch inflected light ſliding upon the globe ought rather to leſſen its dark limb; whereas, on the contrary, the penumbra, which was ſufficiently thick, ſerved, as we all obſerved, to inlarge that limb.

That the teleſcope was clear, appeared from the ſpots of the ſun appearing exactly defined. A parcel of theſe was ſeen ſomewhat below the middle on the right, and above it on the left.

The Mountains.

The moſt ſurpriſing circumſtance to me, as I obſerved to the gentlemen preſent, and made a ſketch of, after half an hour's continual attention, was that of the mountains ſeen in profile, and perfectly well defined; N°. 4. in particular with the ſmall elevation on the left, had ſeveral inequalities and protuberances, which I have drawn exactly enough, though with a pencil not ſufficiently ſharp; I could have been more correct as to particulars, had I had a drawing pen*.

* Mr. Short told me in the month of July 1766, in London, that he had had a ſide view of theſe mountains with his teleſcopes of 8 and 12 feet.

The

The three ſummits of N°. 1, 2, and 3, were very diſtinct, and eſpecially the hollows between them, ſurprizing on account of their depth, for they made cavities within the circle of the diſc. I am no longer aſtoniſhed at the luminous points, which are ſeen ſtarting from the creſcent; but I wonder that no notice ſhould hitherto have been taken of theſe mountains ſeen ſideways in the eclipſes of the ſun: a four feet teleſcope well fixed is neceſſary to obſerve them diſtinctly. Large refracting teleſcopes cannot ſerve for that purpoſe, as it is difficult to prevent intirely their ſhaking. Happily we had none of them; the air was clear, the wind to the north, and I often made the eclipſe move from the top to the bottom of the field of the teleſcope, in order to ſee whether any ſpots in the glaſs did occaſion this phænomenon. But the indentings were ſtill the ſame, and equally well defined; and when their place was known, they were likewiſe ſeen through the other teleſcopes. It is only by ſight that I have marked the place and diſtances of theſe mountains, as the great teleſcope had no wires; but, to remedy this inconveniency, I exactly obſerved the inſtant of the egreſs of the four chief eminences, whence their poſition might be aſcertained: it may be, this ſide of the moon is one of the leaſt mountainous parts.

In delineating the mountain, N°. 4, whoſe figure was ſo exactly defined, I thought of the atmoſphere; but no trace of that is ſeen in that caſe. This, however, in my opinion, does not afford a ſufficient reaſon for denying it, becauſe the atmoſphere, in that poſition,

muſt be, on all ſides, pervaded by the ſolar rays, which muſt render it inviſible to our ſight. It is therefore only againſt the cuſps, and that at the ingreſs and egreſs, that this atmoſphere is to be ſearched for, with very large inſtruments, and ſufficiently well fixed.

Prince de Croy.

N. B. I am inclined to believe, that there is no water in the moon, for the two cavities, which penetrated within the diſk continued concave to the bottom, whereas if there had been there any water, the bottom ought to have been convex. The mountains in the moon muſt be very high and hollow; and that is the reaſon of their white circle. If ever Tycho could be ſeen edge ways, it would make a beautiful appearance.

XXXII. *Obſervation of the Eclipſe of the Sun the 5th of Auguſt* 1766, *near the Courgain at* Calais.

Read Nov. 27, 1766. BEGINNING - $5^h\ 39^m\ 9^f$
End - - - $7\ 19\ 13$

The ſun did not ſet in the ſea till about 14 minutes afther the end of the eclipſe; that is, at leaſt 10 minutes later than the almanac makes it to do at Paris. His lower limb touched the ſea at $7^h\ 23^m$ in thick vapours, which made me prefer the ſetting of this lower limb rather than the centre. It is eaſy to conclude the difference, which ſhould reſult from the different ſituations of Paris and Calais.

No